performed on the cloned miR-140 promoter showed that silencing NFAT3 resulted in its decreased activity.
Conclusions: This is the first study to provide evidence of an independent regulatory mechanism of the intronic miR-140, which is specifically regulated by NFAT3. Such knowledge is important and could open up novel development avenues in therapeutic strategies targeting OA.

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EROSIVE THUMB BASE OSTEOARTHRITIS IN SYMPTOMATIC COMMUNITY-DWELLING ADULTS: THE KEELE CLINICAL ASSESSMENT STUDIES

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Purpose: Erosive osteoarthritis (EOA) is a subset of hand osteoarthritis (HOA), defined by radiographic erosions that are mostly present in interphalangeal joints (IPJs). Data on the prevalence and clinical impact of EOA in 1st carpometacarpal joints (CMCJ) are scarce. The aims were to describe the frequency of erosions in 1stCMCJs in a community-based population with hand symptoms and to explore the clinical impact of EOA on clinical outcomes in comparison to inflammatory disease.
Methods: Postal questionnaires, standardised clinical assessments and hand radiographs were completed in participants of two population-based cohorts in North Staffordshire (CAS-K and CAS-HA), aged ≥50 years who reported hand complaints lasting ≥1 day during past month.
EOA was defined as the presence of eroded/remodeled phase in ≥1 IPJ or 1st CMCJ (Verbruggen-Veys). Thumb base EOA was defined as having ≥1 E- or R-phase in the 1stCMCJs.
Participants were categorized as having an inflammatory rheumatic disease if they had a diagnosis in the general practice or local rheumatology hospital medical records or if they had inflammatory changes on the radiographs.
Self-reported hand pain/function was assessed with AUSCAN Pain and Function subscales (ranges 0–20 and 0–36, respectively). Perceived physical health status (physical component summary score, PCS) was assessed with the SF-12 (range 0–100).
Prevalence of EOA in the population with hand symptoms was calculated by dividing the number of persons with EOA by the sample size, with 95% confidence intervals (95%CI) based on a binomial distribution. Mann-Whitney tests were used to test differences in outcomes between participants with thumb EOA and radiographic non-erosive thumb base OA. Linear regression analyses were used to estimate differences in clinical outcomes between participants with and without EOA, adjusted for age and sex.
Results: The population with hand complaints consisted of 1076 participants (60% women, mean age 64.7 years (SD 8.3). The prevalence of EOA 1st CMCJs only was 4.0% (95%CI 2.6, 5.8), in IPJs/1st CMCJs combined 9.1% (95%CI 7.5, 11.0) and in IPJs only 15.2% (95%CI 12.1, 18.2).
EOA of 1st CMCJs was more often prevalent in men (4.9% vs. 3.5%), whereas EOA of IPJs are more prevalent in women (7.3% vs. 19.2%).
No differences in AUSCAN Pain/Function subscales and PCS were seen between persons symptomatic radiographic thumb base OA and thumb base EOA (p-values 0.83, 0.70 and 0.47, respectively). Persons with EOA scored significantly worse than those without on AUSCAN Pain and Function subscales (adjusted mean difference 1.1 (95%CI 0.2, 2.0) and 1.9 (95%CI 0.2, 3.7), respectively) and on PCS for physical health (adjusted mean difference −0.6 (95%CI −1.1, −0.1). Persons with inflammatory diseases (n = 44) scored worse on AUSCAN Pain and Function subscales and PCS than persons with EOA (adjusted mean difference of 2.2 (95%CI 0.6, 3.8), 7.4 (95%CI 4.1, 10.7) and −9.0 (95%CI −13.3, −4.6), respectively.)
Conclusions: EOA of 1st CMCJs is more often prevalent in men than women. EOA has a substantial impact on pain, function, and physical health perceptions, although not as severe as persons with prevalent inflammatory disease.

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COMPARATIVE ANALYSIS OF BONE EROSIONS AND CYSTS IN RHEUMATOID ARTHRITIS, PSORIATIC ARTHRITIS AND EROSIVE HAND OSTEOARTHRITIS

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Purpose: To investigate the differences in the pattern of erosion formation in patients with rheumatoid arthritis (RA), psoriatic arthritis (PSA) and erosive hand osteoarthritis (EHOA) by a high-resolution micro-computed tomography scanner (μCT) designed to visualize bone architecture. RA, PSA and erosive hand osteoarthritis (EHOA) all lead to joint destruction via formation of erosive lesions but may differ substantially in their quality and distribution pattern.
Methods: 25 patients with RA, 25 patients with PSA and 25 patients age- and sex-matched with EOHA received a micro-computed tomography scan of the dominantly affected hand to compare structural bone changes in the metacarpophalangeal joints. Number, size and distribution of bone erosions and prevalence of cystic lesions were recorded, joint space narrowing was measured
Results: The number of bone erosions was similar in RA, PSA and EHOA, whereas their size was smaller in PSA and EHOA than in RA patients. Moreover, erosions in EHOA showed a specific distribution pattern affecting the ulnar and radial sites of the metacarpal heads (MCH). Furthermore, in EHOA patients the preponderance of the affection of the MCH as compared to the phalangeal bases was far more pronounced. Cystic bone lesions, defined as the absence of trabecular structure in a circumscript area without cortical break were highly prevalent in EHOA (92%) and were localized in peripheral and central subchondral areas of periarticular bone, whereas they were significantly less frequent in RA (24%) and PSA (36%) ($p < 0.01$). Joint space narrowing was associated with the presence of bone cysts and subchondral erosions. Higher age, male sex and postmenopausal state were associated with bone cysts in EOHA Patients.
Conclusions: High-resolution μCT imaging shows profound differences in periarticular bone changes between RA, PSA and EOHA. The differential pattern of erosive lesions and bone cysts in the three different forms of arthritis and in particular the almost complete absence of bone cysts in RA and PSA suggest different mechanisms to be involved in bone remodelling in RA, PSA and EOHA. Our data indicate that it is possible to differentiate between inflammatory- and degeneratively-triggered erosion formation by advanced imaging technology.

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MRI IN HAND OSTEOARTHRITIS: VALIDATION OF THE OSLO HAND OSTEOARTHRITIS MRI-SCORING METHOD AND ASSOCIATION WITH PAIN

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Purpose: Hand osteoarthritis (OA) involves abnormalities in cartilage, subchondral bone and synovium. Magnetic Resonance Imaging (MRI) can visualise all these components at once, in contrast to conventional radiographs or ultrasound (US). We aimed to investigate the reproducibility of the newly developed Oslo Hand Osteoarthritis (OHOA)-MRI scoring system and to validate it against other imaging modalities. Furthermore, we associated MRI features in hand OA with pain and investigated the presence of MRI features in different stages of hand OA.
Methods: Sixteen patients (median age 57 years (range 42–71), 62% female) were recruited from the Rheumatology department of the LUMC. Pain per joint (yes/no) was assessed for the distal and proximal interphalangeal joints (DIPJs, PIPJs). MRI scans of 2nd-5th DIPJs and PIPJs of the right hand were made, using a 3.0T MRI unit. Coronal and sagittal T1-weigthed images pre-and post gadolinium contrast and fat-suppressed T2-weigthed images were obtained. MRI features were scored according to the OHOA-MRI scoring system (based on 1.0T images) for synovitis, erosions, osteophytes (OP) and bone marrow lesions (BML) (grade 0–3). Ultrasound was performed with a 10–14 MHZ linear array transducer and scored for greyscale synovitis and OP. Hand radiographs were scored following the Verbruggen-Veys scoring method. An pre-erosive joint was

defined as J-phase (loss of joint space), erosive joint as E-phase and remodeled joint as R-phase (irregular, sclerotic subchondral plate).
To validate the OHOA-MRI scoring system, intra-reader reliability was assessed on 6 MRI scans, measured with single measurements (ICC, 95% confidence interval (CI)). Validity of MRI features versus US was tested with Spearman's rank correlation coefficients, ρ (p-value). With Generalized Estimated Equations associations between MRI features and pain per joint were calculated to account for within-patient effects, age, sex and BMI. Results were given in odds ratios (OR) with 95% CI.
Results: Thirteen patients (81%) had erosive OA (EOA). The ICCs for synovitis, erosions, osteophytes and BML were good to excellent (range 0.66–1.00). Any/moderate-severe synovitis was seen in 98%/43% of joints on MRI, respectively, compared to 39% greyscale synovitis on US. BML was seen in 27% of the joints, OP in 77% and 99% of the joints on MRI and US, respectively. MRI was not correlated with US grayscale synovitis (Spearman's ρ 0.02, p = 0.79) and only weakly with US OP (ρ 0.16, p = 0.07). The correlation of MRI with radiographs was weak for OP and erosions (Spearman's ρ 0.35 (p < 0.001) and 0.33 (p < 0.001), respectively).
Pain was associated with the presence of moderate/severe synovitis (OR 2.4 (95%CI 0.1–3.2)), BML (OR 3.5 (95%CI 1.6–7.7)), erosions (OR 4.5 (95%CI 1.7–11.9)) and OP (OR 2.4 (95%CI 1.1–5.3)). Having BML on MRI is associated with J- or E-phase presence in that joint (ORs 5.0 (2.2–11.4) and 36.4 (5.1–260.3), respectively), however not with an remodelled joint.
Conclusions: The OHOA-MRI scoring system is reproducible and valid. MRI detects more synovitis ompared to US, but less osteophytes. Presence of moderate/severe synovitis, BML, erosions and osteophytes are associated with pain per joint. BML is associated with having an (pre)erosive joint, but not with a remodelled joint, suggesting that BML could be part of the process in EOA.

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THE ASSOCIATION BETWEEN EROSIVE HAND OSTEOARTHRITIS AND SUBCHONDRAL BONE ATTRITION OF THE KNEE

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Purpose: Central erosions in the hand and subchondral bone attrition (SBA) of the knee have similar appearance and may share a common systemic or genetic predisposition. We therefore sought to examine whether erosive hand osteoarthritis (OA) is associated with MRI-defined SBA of the knee.
Methods: We included 1246 participants from the Framingham Offspring and Community cohorts with available posteroanterior hand radiographs and knee MRI (1.5T; sagittal/coronal proton-density weighted turbo spin-echo, sagittal T1-weighted spin-echo). Two investigators (IKH, PA) scored the bilateral distal interphalangeal (DIP), proximal interphalangeal (PIP), metacarpophalangeal (MCP), thumb base and wrist joints for radiographic hand OA (Kellgren-Lawrence grade (KLG) ≥ 2) and central erosions according to the OARSI atlas. Subchondral erosions were only present in DIP/PIP joints, and our definitions were therefore based on presence of erosive and non-erosive OA in these joints. We defined erosive OA as ≥1 DIP/PIP joint with KLG ≥ 2 and central erosion in the same joint, and non-erosive OA as ≥1 DIP/PIP joint with KLG ≥ 2 and no central erosions. The control group included those with no DIP/PIP OA (i.e. including those with no OA and those with isolated MCP, thumb base and wrist OA). Two musculoskeletal radiologists (AG, FR) scored the knee MRIs for presence of SBA (grade 0–3) using WORMS in 10 subregions of the tibiofemoral joint and 4 subregions of the patellofemoral joint. Any SBA was defined as ≥1 subregion with MRI-defined SBA grade ≥1. We examined the association between presence of erosive or non-erosive OA and presence of any SBA using logistic regression with Generalized Estimating Equations (GEE) to account for correlations between two knees within one person (no DIP/PIP OA as reference). We also explored the association between the number of erosive and non-erosive DIP/PIP joints (in the same model) and presence of SBA among all participants in order to assess the effect of erosive joints while taking into account the number of non-erosive joints as a proxy for the burden of hand OA. The analyses were repeated with the number of SBA as outcome variable (Poisson regression). All analyses were adjusted for age, sex, and body mass index (BMI).
Results: The 1246 participants (735 women) had a mean (SD) age of 63.8 (8.8) years and a mean (SD) BMI of 29.0 (5.8) kg/m^2. Erosive and non-erosive DIP/PIP OA were present in 127 (10.2%) and 461 (37.0%) persons, respectively. In those with erosive OA, the median (interquartile range; IQR) numbers of erosive and non-erosive joints were 3 (1–6) and 5 (3–8), respectively. In those with non-erosive OA, the median (IQR) number of OA joints was 2 (1–4). SBA was present in 37.6% of the knees, and the median (IQR) number of subregions with SBA within the affected knees was 2 (1–4).
Participants with either erosive or non-erosive DIP/PIP OA had more SBA of the knee compared with participants with no DIP/PIP OA (table). Participants with erosive OA had also significantly more subregions with SBA than those with non-erosive OA (RR 1.33 95% CI 1.00–1.76). We found no significant association between the number of erosive DIP/PIP joints and SBA when we adjusted for the number of non-erosive DIP/PIP joints (table).
Analyses with exclusion of those with isolated MCP, thumb base and wrist OA from the control group gave essentially the same results.
Conclusions: Erosive and non-erosive DIP/PIP OA were associated with MRI-defined SBA in the knee. The stronger association seen for erosive OA compared with non-erosive OA seemed to be confounded by greater disease burden in those with erosive OA. These results suggest an association between hand and knee OA, but there was no evidence of a systemic link between hand erosions and knee SBA.

Table: The association between erosive and non-erosive hand OA and MRI-defined SBA of the knee

	Any SBA (logistic regression with GEE)		Number of subregions with SBA (Poisson regression)	
	Crude OR	Adjusted OR (95% CI); p-value	Crude RR	Adjusted RR (95% CI); p-value
Presence of erosive and non-erosive DIP/PIP OA vs. no DIP/PIP OA as reference (one model)				
No DIP/PIP OA	1.00	1.00	1.00	1.00
Erosive DIP/PIP OA	2.11	1.55 (1.04–2.33); p = 0.03	2.36	1.67 (1.21–2.30); p = 0.002
Non-erosive DIP/PIP OA	1.77	1.44 (1.11–1.86); p = 0.005	1.60	1.25 (1.00–1.57); p = 0.05
Number of erosive and non-erosive DIP/PIP joints (one model) among all participants:				
Number of erosive joints	1.02	1.00 (0.92–1.08); p = 0.97	1.06	1.03 (0.98–1.09); p = 0.25
Number of non-erosive joints	1.10	1.07 (1.02–1.12); p = 0.004	1.08	1.04 (1.01–1.07); p = 0.007

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METRIC PROPERTIES OF IMAGING METHODS IN OSTEOARTHRITIS OF THE HAND: A SYSTEMATIC REVIEW

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Purpose: Conventional radiography (CR) depicts only late features of hand osteoarthritis (HOA). To early diagnose and detect response to therapy, other imaging techniques are needed that visualize soft tissue, cartilage and bone in multiple joints with sufficient detail. This is particularly difficult because multiple smaller joints are affected. The techniques should be valid, reliable and responsive. We therefore systematically reviewed the literature on information about validity, reliability and responsiveness of imaging techniques for HOA.
Methods: We systematically searched Pubmed and Embase up to October 2010. Studies were selected if an imaging technique was used to assess HOA and quantitative data was presented on validity, reliability or responsiveness. Articles presenting only data on CR were excluded. The methodological quality was assessed by the QUADAS for validity, the QAREL for reliability and the COSMIN for responsiveness.
Results: 13 ultrasound (US), 3 MRI and 6 scintigraphy studies were eligible out of 461 unique records. US validity was evaluated in 11 studies but none used an external criterion (gold standard). Construct validity using CR as comparator (n = 6) resulted in: moderate agreement for osteophytes (κ = 0.51) and joint space narrowing (JSN) (κ = 0.44); sensitivity of 0.72 and specificity of 1.0 for erosions; significantly more (χ^2: p < 0.05 and GEE model p = 0.01) erosions and osteophytes on US; and R^2 of 0.62 for cartilage thickness when compared with joint space width. Greyscale synovitis (GS) and power doppler signal (PD) showed no agreement with joint pain (κ = 0.10–0.14 and κ = 0.06–0.16; n = 2), while increased OR's (4–5) were reported in 1 other study. 2 studies compared